

MANAGEMENT OF POST- CARDIAC ARREST PATIENTS IN THE ICU

Background

1. CPR should only be carried out in patients who will benefit. It would not benefit patients who are dying of a severe disease or expected to die.
2. Outcome of in-hospital cardiac arrests is very poor. The goal of treatment should be to intervene early before the patient deteriorates to develop unexpected arrest
3. VT/VF is a more 'resuscitatable' rhythm than non VT/VF, and carries a better prognosis for hospital discharge
4. Hypoxic brain damage is the most devastating consequence after cardiac arrest. In general, neurological recovery is poor if time to return of spontaneous circulation (ROSC) is > 30 minutes.
5. No reliable criteria to predict hospital outcome. Some of the poor prognostic factors are 1) old age (>80), 2) malignancy, 3) renal failure, 4) absence of pupillary reaction or corneal reflexes at 24 hours, 5) a motor response poorer than flexion response at day 3, and 6) myoclonic seizures after cardiac arrest

Admission criteria

No reliable criteria or score to predict hospital outcome.

Factor to consider:

- ◆ Age
- ◆ Premorbid status / medical problems
- ◆ Precipitating event
- ◆ Time to ROSC
- ◆ Arrest Rhythm (VF/VT better outcome than asystole)

Always check with ICU senior wrt admission

Management after admission

1. Treat underlying cause
For example, thrombolysis / percutaneous coronary intervention for ACS, RRT for hyperkalemic arrest
2. Organ support

3. Treat myoclonic seizures
Valproate and clonazepam as preferred anti-convulsants
If status myoclonus, consider midazolam or propofol infusion
Consider continuous EEG monitor, especially if patient is paralysed
4. Cerebral protection with hypothermia (see below and refer to the next chapter)

Therapeutic hypothermia (TH) to improve neurological outcome after cardiac arrest

1. Two RCTs (published in NEJM Feb 2002) showed that hypothermia of 32-34⁰C for 12-24 hrs improved neurological outcome in survivors of out-of-hospital VT/VF arrests. One of these studies also showed improvement in mortality.
2. Mechanisms for brain protection
 - Decrease in cerebral metabolism
 - Delayed anoxic / ischemic depolarization
 - Preservation of ion (Ca, Na) hemostasis
 - Decrease in excitatory neurotransmission
 - Prevention or reduction of damaging secondary biochemical changes
3. Patients not following commands after CPR should be considered for TH. Coagulopathy, received thrombolytic, hemodynamic instability are not AbSOLUTE contraindication for TH. If in doubt as to who should be offered TH, always check with your senior.
4. Practical tips:
 - 1) Institute hypothermia as soon as possible after ICU admission
 - 2) Aim to achieve 32-34⁰C by the 4-6th hour after arrest (if achieved earlier, the better)
 - 3) Continuous core temp monitoring with NP or OP temperature probe
 - 4) Surface cooling usually suffices
 - Ice packs, tepid sponging
 - Convective air cooling device (Polar Air)
 - Criti-cool cooling device is commonly used in our unit.
Check with senior about the setting and target temp
 - 5) Sedate with or without paralysis. Avoid shivering
 - 6) Beware of the following complications during cooling
 - Hypertension due to vasoconstriction

- Bradycardia or other arrhythmias
 - Progressive lactic acidosis due to increased myocardial afterload / myocardial depression
 - Bleeding tendency, especially if thrombolytic and /or heparin given
- 7) Continue hypothermia for 24 hours from the start of cooling (or at least 12 hrs after target temperature is reached)
- 8) Allow passive re-warming afterwards
- Beware of hypotension as patient vasodilates
 - Gradual rewarming. Aim not more than 1°C over 3-4 hours
 - Stop sedation and paralysis after temperature reaches 36⁰C